VERIFICATION OF TRANSLATION

I, undersigned below, hereby declare that:

My name and post office address are as stated below:

That I am knowledgeable in the English language and in the language in which the below identified U.S. Provisional Application was filed, and that I believe the attached English translation of the U.S. Provisional Application No. 60/459,958 filed on April 2, 2003 is a true and complete translation of the above-identified Provisional Application as filed.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 10/8/2004

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[Document Name] Specification

[Title of the Invention] AIR INTAKE DEVICE FOR ALL-TERRAIN VEHICLE

[Claims]

[Claim 1] An air intake device for an all-terrain vehicle having wheels for running over rugged terrain arranged at respective right and left sides of front and rear portions of a body frame, a seat for two riders arranged at a generally center portion of the body frame in a fore to aft direction, and an engine disposed below the seat, wherein an air cleaner is disposed behind a hood that extends between and over the right and left front wheels, and the air cleaner is connected to a throttle body that has a throttle valve and is coupled with an intake port of the engine, through an intake duct.

[Claim 2] The air intake device for the all-terrain vehicle according to Claim 1, wherein the seat is divided into right and left seat pieces, the throttle body is disposed between the right and left seat pieces, the intake duct extends to the seat along a floor panel from the air cleaner, further the intake duct extends upward to be coupled with the throttle body, the upward extending portion and a portion of the intake duct that extends from the upward extending portion to an upstream side of the throttle body forms an accumulator that has a cross-sectional area larger than a cross-sectional area of the rest of the intake duct.

[Claim 3] The air intake device for the all-terrain vehicle according to Claim 1 or 2, wherein a portion of the intake duct that is connected to the air cleaner is positioned at a location higher than the air cleaner.

[Claim 4] An air intake device for an all-terrain vehicle having wheels for running over rugged terrain arranged at respective right and left sides of front and rear portions of a body frame, a seat for two riders arranged at a generally center portion of the body frame in a fore to aft direction,

and an engine disposed below the seat, wherein the seat is divided into right and left seat pieces, and an air cleaner is disposed between the right and left seat pieces.

[Claim 5] The air intake device for the all-terrain vehicle according to Claim 4, wherein the engine is mounted on the vehicle such that at least a portion of a cylinder head of the engine is located in the rear of a rear edge of the seat, a throttle body that has a throttle valve is connected to a front wall that is positioned in front of the cylinder head in a fore to aft direction, and the air cleaner is connected to a upstream side of the throttle body.

[Claim 6] The air intake device for the all-terrain vehicle according to Claim 4 or 5, wherein an air inlet of the air cleaner is positioned higher than a top surface of the seat.

[Detailed Description of the Invention]

[Field of the Invention]

This invention relates to an air intake device for an all-terrain vehicle.

[Prior Art]

Generally, this type of all-terrain vehicles have wheels, each of which mounts a balloon tire, arranged at respective right and left sides of front and rear portions of a body frame, a seat for two riders arranged at a generally center portion of the frame in a fore to aft direction, and an engine disposed below the seat.

The all-terrain vehicles, because of the purposes thereof, should be able to proceed even though the wheels are almost submerged. Thus, some of the all-terrain vehicles have an air cleaner positioned at a location below the seat and in the proximity of the engine not to introduce the water into the air cleaner while the vehicle runs in the water (For example, see Patent Document 1).

[Patent Document 1]

JP-A-2000-103246

[Problems to be Solved by the Invention]

However, because the conventional all-terrain vehicles have a structure in which the air cleaner is disposed in the proximity of the engine, the temperature of the air cleaner tends to rise and can adversely affect the engine performance.

Also, because the conventional vehicles have a structure in which the air cleaner is disposed below the seat, the air cleaner is apt to introduce water thereinto while the vehicle runs in the water that has a depth such that the wheels are entirely submerged. Some appropriate measures are desired to solve the problem.

The present invention has been made to meet the conventional circumstances. An object of the present

invention thus is to provide an intake device that can exclude the adverse influence from the engine performance by inhibiting the rise of the temperature of the air cleaner due to the heat of the engine, and also that can surely prevent the suction of water into the air cleaner during the vehicle runs in the water.

[Means for Solving the Problems]

The invention of Claim 1 is characterized by an air intake device for an all-terrain vehicle having wheels for running over rugged terrain arranged at respective right and left sides of front and rear portions of a body frame, a seat for two riders arranged at a generally center portion of the body frame in a fore to aft direction, and an engine disposed below the seat, wherein an air cleaner is disposed behind a hood that extends between and over the right and left front wheels, and the air cleaner is connected to a throttle body that has a throttle valve and is coupled with an intake port of the engine, through an intake duct.

The invention of Claim 2 is characterized by the air intake device for the all-terrain vehicle according to Claim 1, wherein the seat is divided into right and left seat pieces, the throttle body is disposed between the right and left seat pieces, the intake duct extends to the seat along a floor panel from the air cleaner, further the intake duct extends upward to be coupled with the throttle body, the upward extending portion and a portion of the intake duct that extends from the upward extending portion to an upstream side of the throttle body forms an accumulator that has a cross-sectional area larger than a cross-sectional area of the rest of the intake duct.

The invention of Claim 3 is characterized by the air intake device for the all-terrain vehicle according to Claim 1 or 2, wherein a portion of the intake duct that is connected to the air cleaner is positioned at a location higher than the air

cleaner.

The invention of Claim 4 is characterized by an air intake device for an all-terrain vehicle that is similar to the vehicle recited in Claim 1, wherein the seat is divided into right and left seat pieces, and an air cleaner is disposed between the right and left seat pieces.

The invention of Claim 5 is characterized by the air intake device for the all-terrain vehicle according to Claim 4, wherein the engine is mounted on the vehicle such that at least a portion of a cylinder head of the engine is located in the rear of a rear edge of the seat, a throttle body that has a throttle valve is connected to a front wall that is positioned in front of the cylinder head in a fore to aft direction, and the air cleaner is connected to a upstream side of the throttle body.

The invention of Claim 6 is characterized by the air intake device for the all-terrain vehicle according to Claim 4 or 5, wherein an air inlet of the air cleaner is positioned higher than a top surface of the seat.

[Effect of the Invention]

According to the air intake device of the invention recited in Claim 1, because the air cleaner is disposed behind the hood that extends between and over the right and left front wheels, the air cleaner can be spaced apart from the engine disposed below the seat. Thus, the rise of the temperature of the intake air due to the heat of the engine can be inhibited to exclude the adverse influence from the engine performance.

In addition, even though the all-terrain vehicle runs in the water that has the depth such that the wheels are entirely submerged, the air cleaner does not introduce the water thereinto, because the air cleaner is disposed behind the hood that is positioned above the front wheels. Thereby, the suction of water into the intake system can be avoided.

According to Claim 2, the intake duct extends to the seat along the floor panel from the air cleaner, further the intake duct extends upward to be coupled with the throttle body. Thus, the intake duct can be routed and spaced apart from the engine, and the heat of the engine does not raise the temperature of the intake air.

Also, because the portion of the intake duct can be used as volume of the accumulator, the intake responsibility can be improved. Additionally, the accumulator is inevitably disposed in the proximity of the engine. The accumulator, however, has a heat capacity that is less than a heat capacity of the air cleaner. The influence by the engine heat is not so large, accordingly.

According to Claim 3, because the portion of the intake duct is positioned higher than the air cleaner, the higher portion of the intake duct can prevent the water in the air cleaner, if any, from entering the engine.

According to Claim 4, because the air cleaner is disposed between the right and left seat pieces, the air cleaner is hard to be affected by the engine heat and also is hard to introduce water thereinto in comparison with the conventional air cleaner disposed under the seat.

According to Claim 5, the engine is mounted on the vehicle such that at least the portion of the cylinder head of the engine is located in the rear of the rear edge of the seat, the throttle body is connected to the front wall of the cylinder head, and the air cleaner is connected to the throttle body. Thus, the air cleaner can be spaced apart from the cylinder head that has the highest temperature to exclude the adverse influence from the engine performance.

According to Claim 6, because the air inlet of the air cleaner is positioned higher than the top surface of the seat, the air cleaner is positioned higher than the wheels. Thus, the suction of water can be surely avoided.

[Embodiment of the Invention]

An embodiment of the present invention will be described hereinafter with reference to the attached figures.

FIGS. 1 to 7 illustrate an air intake device for an all-terrain vehicle constructed in accordance with an embodiment of the present invention recited in Claims 1, 2 and 3. FIGS. 1 and 2 are a side view and a top plan view of the all-terrain vehicle, respectively. FIGS. 3 and 4 are side views of an engine unit. FIG.5 is a top plan view of the engine unit, and FIGS. 6 and 7 are a top plan view and a rear view of an air discharge duct, respectively. Additionally, the terms "front," "rear," "right" and "left" mean front, rear, right and left sides which are defined when a rider is seated in the seat.

In the figures, the reference numeral 1 indicates an all-terrain vehicle. The vehicle 1 has front and rear wheels 3, 4 that mount balloon tires for running over rugged terrain on each right front, left front, right rear and left rear end of a body frame 2. The vehicle 1 has a seat 5 for two riders arranged at a center portion of the body frame 2 in a fore to aft direction. The seat 5 is divided into right and left seat pieces. The vehicle 1 also has an engine unit 6 below the seat 5.

The body frame 2 has a drive unit 11 that distributes the power from the engine unit 6 to front and rear drive shafts 7, 8 and transmits the power to the right front, left front, right rear and left rear wheels 3, 4 through front and rear differentials 9 and 10. The body frame 2 also has a steering device 13 that transmits a rotational movement of a steering wheel 12 which is disposed in front of the seat 5 to the front right and left wheels 3 through a steering shaft 55. The body frame 2 further has front and rear suspension devices 14, 15 that suspend the respective right and left front and rear wheels 3, 4 such that those wheels 3, 4 can

independently swing up and down. In addition, a hood 16 that covers the right and left front wheels 3 is arranged in a front area of the body frame 2 to have open and closed positions, and a carrier 17 is arranged in the rear of the seat 5.

The steering shaft 55 inclines rearward and upward, and the inclination angle thereof is adjustable by a ratchet type tilting mechanism (not shown). Thereby, a suitable position of the steering wheel 12 in height can be set at the rider's option in accordance with a stature of the rider.

The body frame 2 is provided with a main frame 20, a front frame 21, a rear frame 22 and right and left pillar frames 24, 24. The main frame 20 comprises right and left side members 18, 18 and cross members 19 that couple respective front, center and rear portions of the side members 18, 18 with each other. The front frame 21 stands on a front portion of the main frame 20, and the rear frame 22 stands on a rear portion thereof. The pillar frames 24, 24 are disposed between the front frame 21 and the rear frame 22 to form a vehicle compartment together with the main frame 20.

A floor panel 23 is disposed between the front frame 21 and the rear frame 22 of the main frame 20 to bridge the right and left pillar frames 24, 24.

As shown in FIGS. 4 and 5, respective arm rests 65 are pivotally affixed to the right side of the right pillar frame 24 and to the left side of the left pillar frame 24. Each arm rest 65 supports the elbow of each rider, and can pivot between a unused position in which the arm rest 65 extends along a side surface of seatbacks 30b, 31b and a used position in which the arm rest 65 extends forward generally horizontally. Also, Each one of the right and left seat pieces 31, 30 has a three-point retaining type seat belt (not shown) to hold each rider's driving position when the all-terrain vehicle runs over rugged terrain. Metal fittings

(not shown) that fix the seat belts are, for example, attached to some portions positioned inside of the pillar frame 24 such that the fittings cannot be caught by branches of trees or the like while the all-terrain vehicle proceeds in a forest.

A forward end of the body frame 2 has a front bumper 27. A radiator 28 is disposed under the hood 16 between the front bumper 27 and the front frame 21, and a battery 29 is disposed in the rear of the battery 29. The battery 29 is placed above a front differential 9 and is affixed to the front frame 21.

Because the battery 29 is disposed in the rear of the radiator 28, the weight balance of the vehicle can be improved in comparison with an arrangement, for example, in which the battery 29 is disposed below the seat and in the proximity of the engine. That is, the center of gravity of the vehicle can be positioned close to the forward wheels. Thereby, the weight balance can be appropriate. Also, because a cooling fan 28a of the radiator 28 can cool the battery 29, the rise of the battery temperature can be avoided. Further, because the battery 29 is placed above a front differential 9 under the hood 16, the battery 29 cannot be soaked while the vehicle proceeds in a pool, pond or river. Furthermore, because the battery 29 disposed on the front frame 21 can make a larger empty space under the seat than a battery disposed under the seat, voluminous things such as a fuel tank and a luggage box can be disposed under the seat 5 using the space.

The seat 5 is divided into right and left seat pieces 31, 30. Both the right and left seat pieces 31, 30 are positioned at a front end portion of a top surface of the rear frame 22 to be spaced apart from each other in a transverse direction. Each one of the right and left seat pieces 31, 30 has a structure in which a seatback 30b, 31b is unitarily formed

with a detachable seat cushion 30a, 31a. The steering wheel 12 is disposed in front of the left seat piece 30. A shift lever 42 is disposed in a forward area of a space located between the right and left seat pieces 31, 30. The shift lever 42 can shift the transmission among parking, forward H-N-L and reverse positions.

The engine unit 6 is provided with a water-cooled, four cycle, single cylinder engine 35, and a V belt type continuously variable transmission 36 that works as a power transmission device and is unitarily joined with the engine. The V belt type continuously variable transmission 36 is placed on a left side of the engine 35 in the transverse direction.

The engine 35 is provided with a crankcase 35a that has a crankshaft 37 extending horizontally in the transverse direction, a cylinder block 35b coupled with the crankcase 35a, a cylinder head 35c coupled with the cylinder block 35b, and a head cover 35d attached to the cylinder head 35c. A front wall 35e of the cylinder head 35c has an intake port 35f, and a rear wall 35g thereof has exhaust ports 35h.

A transmission case 38 is connected to a left wall of the crankcase 35a and encloses the V belt type continuously variable transmission 36. The V belt continuously variable transmission 36 includes a drive pulley 36a attached to the crankshaft 37, a driven pulley 36b attached to an output shaft 39 that extends parallel to the crankshaft 37, and a V belt wound around the drive pulley 36a and the driven pulley 36b. The engine output from the output shaft 39 is transmitted to the front and rear drive shafts 7, 8 through a bevel gear mechanism 40.

The power transmission device has a belt chamber cooling mechanism that introduces cooling air into a belt chamber of the transmission case 38.

Rear and front walls of the transmission case 38 have a

cooling air inlet 38a and a cooling air outlet 38b, respectively. A lower end 67a of a cooling air intake duct 67 that extends vertically is connected to the cooling air inlet 38a. The cooling air intake duct 67 is positioned between the right and left seat pieces 31, 30 and in the rear of the seatbacks 30b, 31b. A top end opening 67b of the cooling air intake duct 67 is positioned at a location higher than seat surfaces of the seat cushions 30a, 31b and opens forwardly. As shown in phantom line in FIG. 4, the cooling air intake duct 67' can extend toward a top edge of the seatback 30b to have a top end opening 67b' that opens rearward. This arrangement can surely exclude the adverse influence of the engine heat to the cooling air.

An upstream opening 68a of the cooling air discharge duct 68 is connected to the cooling air outlet 38b. The cooling air discharge duct 68 has a vertical duct portion 68c that extends upward, and a horizontal duct portion 68d that extends generally horizontally and rearward from a top end of the vertical duct portion 68d under the left seat cushion 30a. A downstream opening 68b disposed at a rear end of the horizontal duct portion 68d extends rearward to open under the seat cushion 30a.

The horizontal duct portion 68d extends along an inside edge of the seat cushion 30a in a plan view to generally hide behind the seat cushion 30a. Also, the horizontal duct portion 68d has a triangle shape in cross-section that extends along a bottom wall 30c of the seat cushion 30a.

According to the power transmission device of the illustrated embodiment, because the cooling air intake duct 67 is connected to the cooling air inlet 38a formed on the rear wall of the transmission case 38, the top end opening 67b of the intake duct 67 is positioned higher than the seat surfaces, the cooling air discharge duct 68 is connected to the cooling air outlet 38b formed on the front wall, and the

downstream opening 68b of the discharge duct 68 opens at a proximal area of the rear end portion of the seat cushion 30a under the seat cushion 30a, the top end opening 67b that introduces the cooling air and the downstream opening 68b that discharges the cooling air can be positioned higher than the front and rear wheels 3, 4. Thus, even though the vehicle runs the depth such that the front and rear wheels 3, 4 are submerged, the water is inhibited from entering the belt chamber, and the vehicle can travel again without any problems when the engine is re-started.

In the illustrated embodiment, the cooling air intake duct 67 is disposed between the right and left seat pieces 31, 30 and in the rear of the seatback 30b, and top end opening 67b opens forwardly. Thus, the wind that is made while the vehicle proceeds and has a relatively low temperature can be introduced into the belt chamber to efficiently cool the V belt 36c. Deterioration of the V belt by friction heat can be avoided, accordingly.

Also, because the horizontal duct portion 68d of the discharge duct 68 opens rearward at a proximal area of the rear end portion of the seat cushion 30a under the seat cushion 30a, the noise that is made in the belt chamber and is harsh on the ears can go out rearward than the riders. Thus, the riders can be released from the noise.

Further, because the horizontal duct portion 68d of the cooling air discharge duct 68 is positioned under the seat cushion 30a to hide behind the seat cushion 30a, the vehicle can keep good appearance.

In the illustrated embodiment, because the horizontal duct portion 68d has a triangle shape in cross-section that extends along the bottom wall 30c of the seat cushion 30a, the cooling air discharge duct 68 can keep good appearance and can be compact.

The engine unit 6 is mounted onto the rear frame 22 such

that the output shaft 39 is positioned in front of the crankshaft 37, the crankshaft 37 and the output shaft 39 are placed below the seat 5, and a center line of the engine unit 6 extends between the right and left seat pieces 31, 30 and is centrally positioned in the transverse direction of the vehicle.

A portion of the cylinder block 35b and the cylinder head 35c protrudes rearward than rear bottom ends of the seatbacks 31b, 30b of the right or left seat piece 31, 30. Also, the cylinder block 35b and the cylinder head 35c extend obliquely upward such that a cylinder axis A slants upward approximately, for example, 45 degrees.

Because the engine unit 6 is mounted on such that the output shaft 39 and the crankshaft 37 are positioned under the seat 5, and the output shaft 39 is positioned in front of the crankshaft 37, the cylinder head 35c of the engine unit 6 inevitably is directed rearward. Thus, a portion of the engine unit 6 that protrudes rearward can be small without intervening with the seat 5 and feet of the riders' feet. As a result, the wheelbase can be short to make the vehicle smaller.

Also, because the cylinder head 35c is directed rearward, the engine heat is inhibited from influencing the riders. Hence, the riders can directly change seats between the right and left seat pieces 31, 30.

In the illustrated embodiment, 35, i.e., a portion of the cylinder block 35b and the cylinder head 35c, protrudes rearward than rear bottom ends of the seatbacks 31b, 30b, and inclines obliquely upward. Thus, the cylinder block 35b and the cylinder head 35c, both of which have much heat, can be spaced apart from the riders, and therefore the influence by the engine heat can be avoided.

An intake device 45 that extends forward is connected to the front wall 35e of the cylinder head 35b, while an exhaust

device 46 that extends rearward is connected to the rear wall 35g of the cylinder head 35b.

The exhaust device 46 is provided with a pair of exhaust pipes 47, 47 which are coupled to the rear wall 35g to be connected to the respective exhaust ports 35h, and an exhaust muffler 48 which is coupled to each downstream end of the exhaust pipes 47. Each exhaust pipe 47 has a wavy shape that serpentines up and down in a side view. The muffler 48 is disposed around a rear end of the body frame 2 to transversely extend.

As shown in FIGS. 8 and 9, the muffler 48 can extend transversely in the rear of the engine unit 6 and in front of the axle of the rear wheels 4. When the muffler 48 is arranged, as shown in the figures, to extend in the transverse direction in the proximity of the engine unit 6 and in the rear thereof within an area of the wheelbase, the moment of inertia in the yaw direction does not increase and contributes to keep a good control of the vehicle. In other words, if the muffler, which is a heavyweight thing, is spaced apart from the center of gravity of the vehicle, the moment of inertia in the yaw direction becomes large to bring in an unstable control of the vehicle.

Next, the intake device 45 is described. The intake device 45 is constructed such that a downstream end of a throttle body 50 is coupled to the front wall 35e through an intake pipe 49 to be connected to the intake port 35f, a downstream end of the intake duct 51 is coupled to a upstream end of the throttle body 50 through an accumulator 53, and an air cleaner 52 is coupled to a upstream of the intake duct 51.

The throttle body 50 has a throttle valve 50a that changes a cross-sectioned area of an intake passage. An accelerator pedal that is disposed in front of the left seat piece 30 is connected to the throttle valve 50a.

The air cleaner 52 is disposed behind and close to the

hood 16 that extends between and over the right and left front wheels 3. The air cleaner 52 is affixed to the front frame 21. Also, the air cleaner 52 inclines forwardly downwardly along the hood 16, and the intake duct 51 is connected to a rear end surface 52a of the air cleaner 52.

The intake duct 51 includes a slant section 51d that extends contiguously from the rear end surface 52a of the air cleaner 52 and extends obliquely rearward and upward to be positioned at a location higher than the air cleaner 52, a vertical section 51a that extends generally vertically downward from a top end of the slant section 51d, a horizontal section 51b that extends under the floor panel 23 from a bottom end of the vertical section 51a generally toward a forward end of the seat 5, and a rising section or upward extending section 51c that extends generally vertically upward along a forward surface of the rear frame 22 from a rear end of the horizontal section 51b.

The rising section 51c and a contiguous portion of the intake duct 51 that extends contiguously from the rising section 51c to the upstream end of the throttle body 50 together form the accumulator 53 that has a cross-sectional area larger than a cross-sectional area of the intake duct 51.

According to the intake device 45 in the illustrated embodiment, because the air cleaner 52 is disposed behind and close to the hood 16 that extends between and over the right and left front wheels 3, the air cleaner 52 can be spaced apart from the engine unit 6 to inhibit the engine heat from increasing the intake temperature. Thus, an adverse influence such that the charging efficiency is deteriorated by the increase of intake temperature can be avoided.

Also, because the air cleaner 52 is positioned above the front wheels 3, the air cleaner does not introduce water thereinto even though the vehicle runs the depth such that

the front wheels 3 are wholly submerged. Water invasion into the engine thus can be prevented.

In the illustrated embodiment, the intake duct 51 is provided with the vertical section 51a that extends downward from the air cleaner 52, the horizontal section 51b that extends under the floor panel 23 from the vertical section 51a toward the seat 5, and the rising section 51c that extends upward from the horizontal section 51b. Because of the construction, the intake duct 51 can be routed and spaced apart from the engine unit 6 to inhibit the engine heat from increasing the intake temperature.

Also, because the rising section 51c and the contiguous portion of the intake duct 51 that extends contiguously from the rising section 51c to the throttle body 50 can be used as the volume of the accumulator, the intake responsibility can be assured. In addition, even though the accumulator 53 is positioned close to the engine 35, the influence by the engine heat is not so large because the accumulator 53 has a heat capacity smaller than that of the air cleaner 52.

In the illustrated embodiment, because the slant section 51d of the intake duct 51 connected to the air cleaner 52 is positioned higher than the air cleaner 52, the water inflow into the engine can be avoided even though water can enter the air cleaner 52.

Additionally, the example has been described such that the air cleaner 52 is positioned behind the portion of the hood 16 that extends between the right and left front wheels 3 in the illustrated embodiment. However, any other arrangements of the air cleaner are applicable.

FIG. 10 illustrates another embodiment of the intake device configured in accordance with the present invention recited Claims 4, 5 and 6. In the figure, the same reference numerals as those of FIG. 3 indicate identical or similar portions.

In the modified embodiment, the engine 35 also is mounted

onto the vehicle such that the major part of the cylinder head 35c is positioned in the space below and between the right and left seat pieces 31, 30 and in the rear of the rear bottom end of the seatback 30b. The throttle body 50 is coupled with the front wall 35e of the cylinder head 35c to extend forwardly therefrom. The engine mount structure is the same as that of the foregoing embodiment.

In the modified embodiment, an air cleaner 52'is disposed between the right and left seat pieces 31, 30, and the air cleaner 52' is coupled with the throttle body 50 to extend forwardly therefrom. An air inlet 52a' of the air cleaner 52'is positioned at a location higher than the top surface of the seat cushion 30a to open upward.

In the modified embodiment, the engine 35 is mounted onto the vehicle such that the major part of the cylinder head 35c is positioned in the rear of the rear bottom end of the seatback 30b, and the air cleaner 52' is positioned between the right and left seat pieces 31, 30. Because of the arrangement, the air cleaner 52' can be spaced apart from the cylinder head 35c. The rise of the intake temperature thus can be inhibited to exclude the adverse influence from the engine performance.

Further, because the air inlet 52a'of the air cleaner 52' opens upward above the seat cushion 30a, the opening of the air cleaner 52' can be positioned higher than the front and rear wheels 3, 4 to prevent the air cleaner 52' from introducing the water thereinto while the vehicle runs by the water.

[Brief Description of the Drawings]

[FIG. 1]

FIG. 1 is a side view of an all-terrain vehicle to explain an embodiment of the present invention recited in Claims 1, 2 and 3.

[FIG. 2]

FIG. 2 is a top plan view of the all-terrain vehicle.

[FIG. 3]

FIG. 3 is a side view of an engine unit that is mounted on the all-terrain vehicle.

[FIG. 4]

FIG. 4 is a side view of the engine unit.

[FIG. 5]

FIG. 5 is a top plan view of the engine unit.

[FIG. 6]

FIG. 6 is a top plan view of a cooling air discharge duct of the engine unit.

[FIG. 7]

FIG. 7 is a rear view of the cooling air discharge duct.

[FIG. 8]

FIG. 8 is a top plan view showing a modified muffler arrangement made in accordance with a variation of the foregoing embodiment.

[FIG. 9]

FIG. 9 is a side view of the muffler arrangement.

[FIG. 10]

FIG. 10 is a side view to explain another intake device of the present invention recited in Claims 4, 5 and 6.

[Description of Reference Numerals]

1	all-terrain vehicle
2	body frame
3	front wheels
4	rear wheels
5	seat
16	hood
30	left seat piece
31	right seat piece
35	engine
35c	cylinder head
35e	front wall

36	V belt type continuously variable transmission
37	crankshaft
38	transmission case
39	output shaft
45	intake device
50	throttle body
51	intake duct
52, 52'	air cleaner

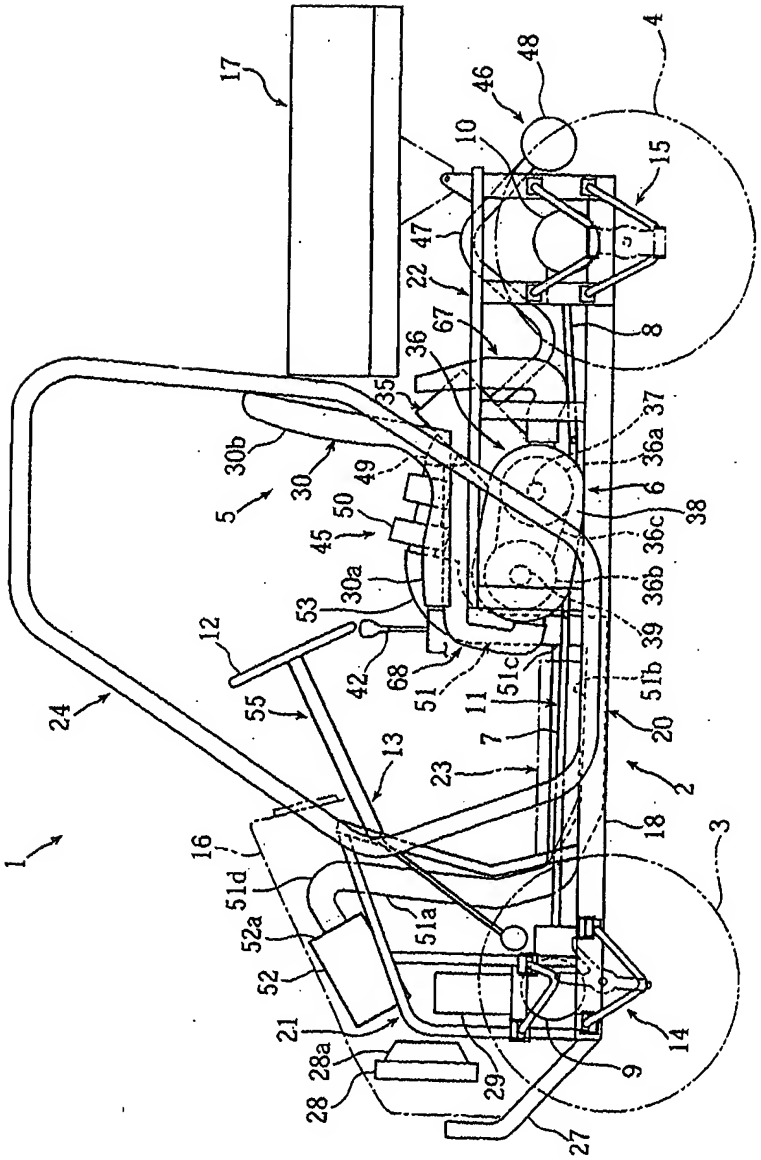
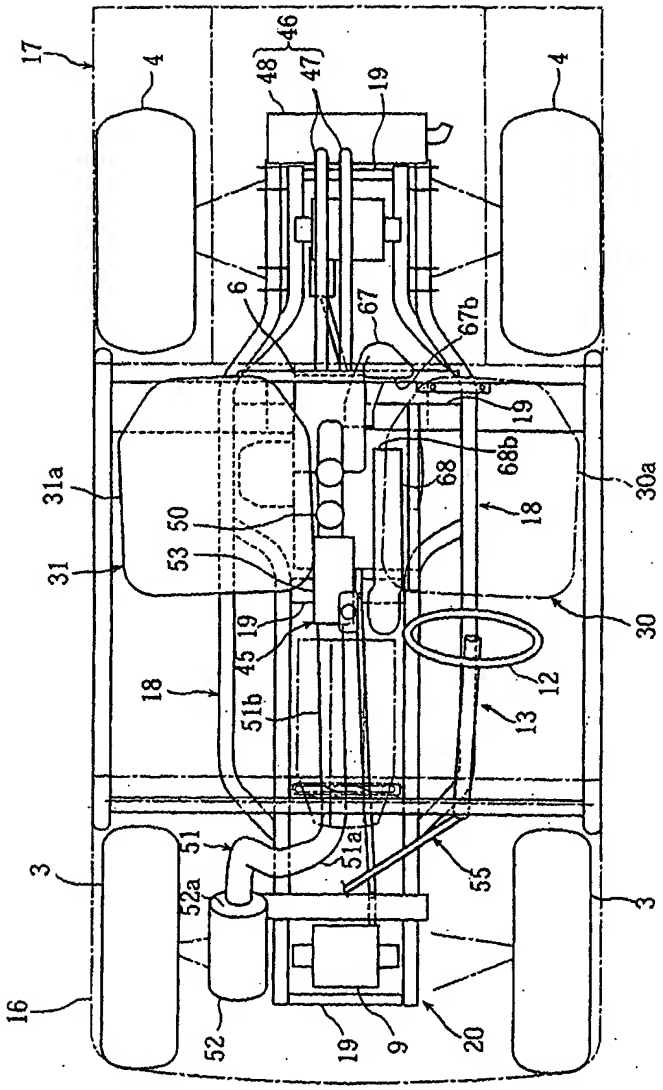


FIG. 1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31a
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31
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19
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3
52a
3
16
52
19
9
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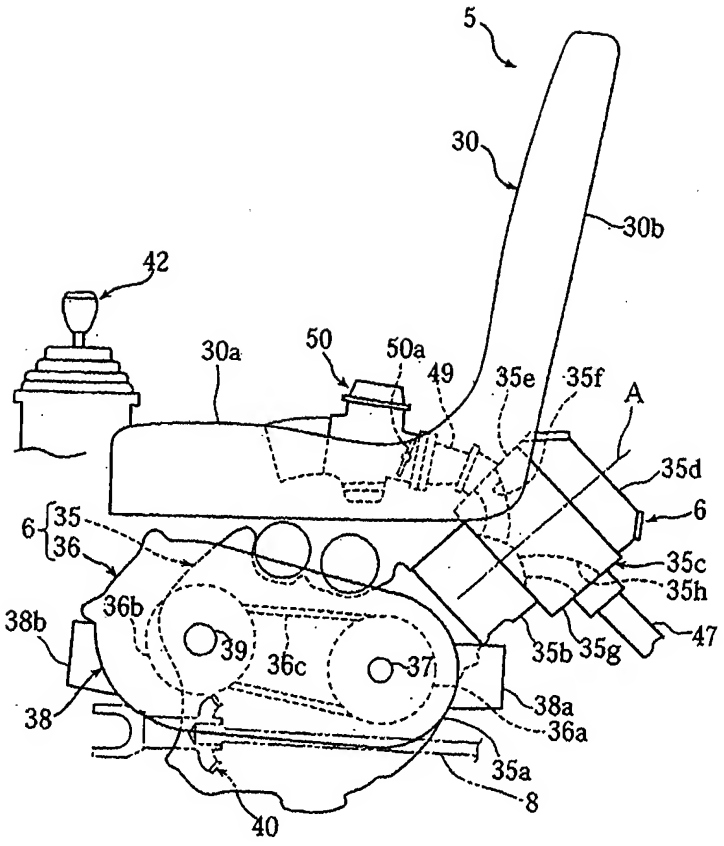
FIG. 2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50a
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35d
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6
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35g
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36a
35a
8
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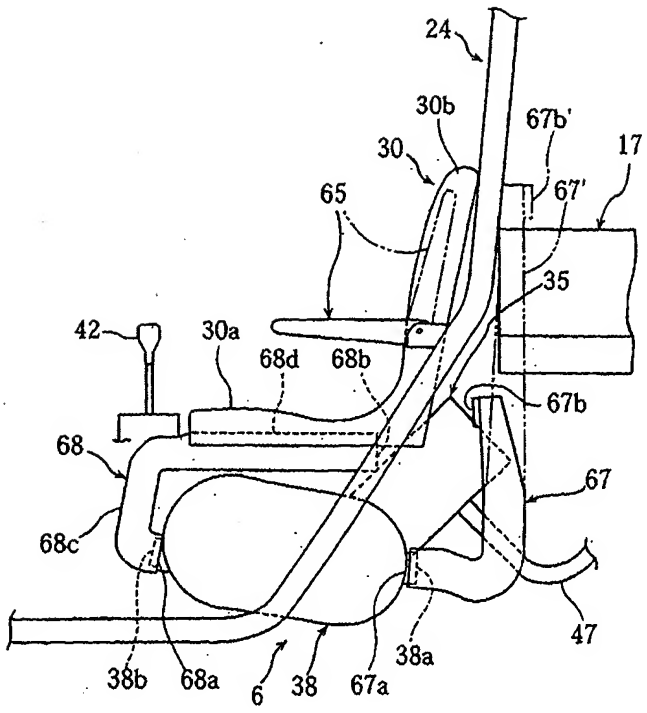
FIG. 3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38b
68a
6
38
67a

FIG. 4

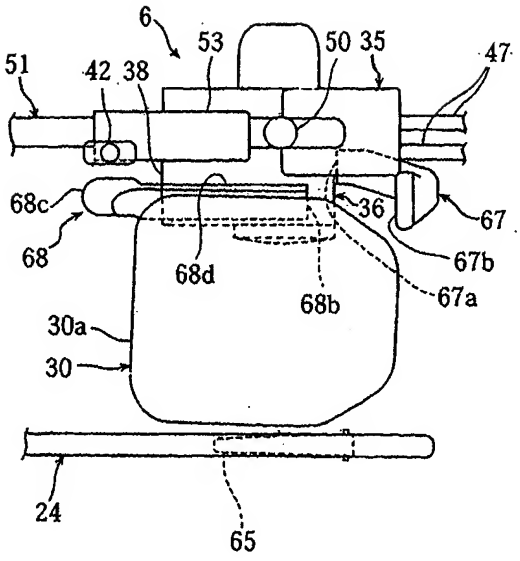

FIG. 5

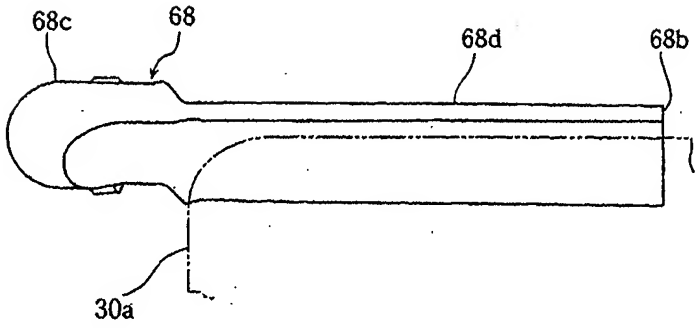

FIG. 6

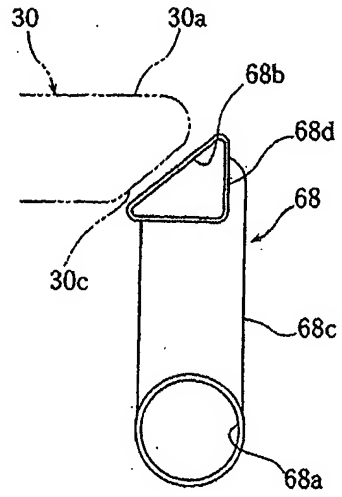

FIG. 7

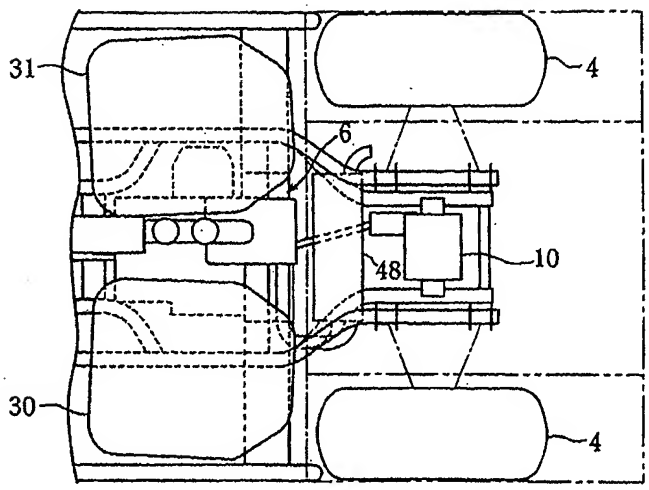

FIG. 8

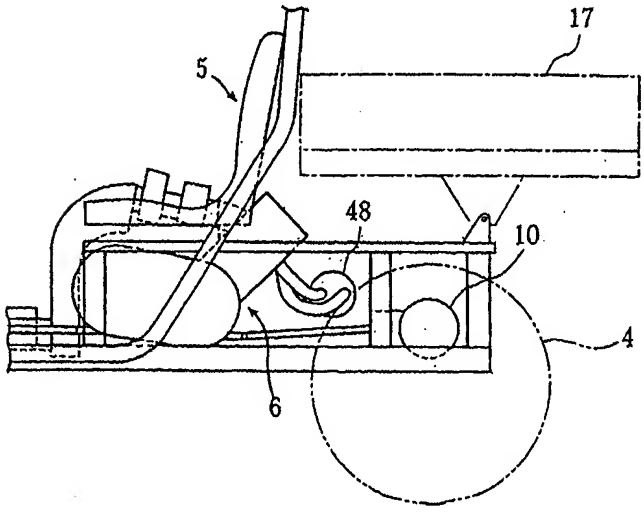

FIG. 9

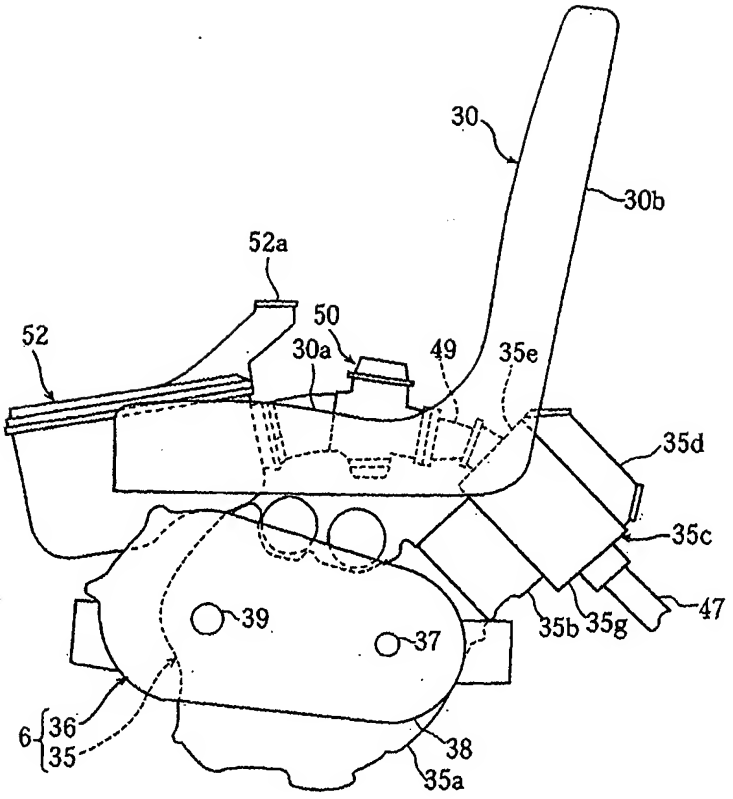

FIG. 10

[Document Name] Abstract

[Abstract]

[Problem to be Solved] To provide an intake device for an all-terrain vehicle that can exclude adverse influence of the engine heat from the engine performance, and further can prevent water from entering the engine while the vehicle runs by the water.

[Solution] An air cleaner 52 is positioned behind a hood 16 that extends between and over right and left front wheels 3, 3, and an intake duct 51 connects the air cleaner 52 and an engine 35 that is positioned below a seat 5 to each other.

[Selected Drawing] FIG. 1